

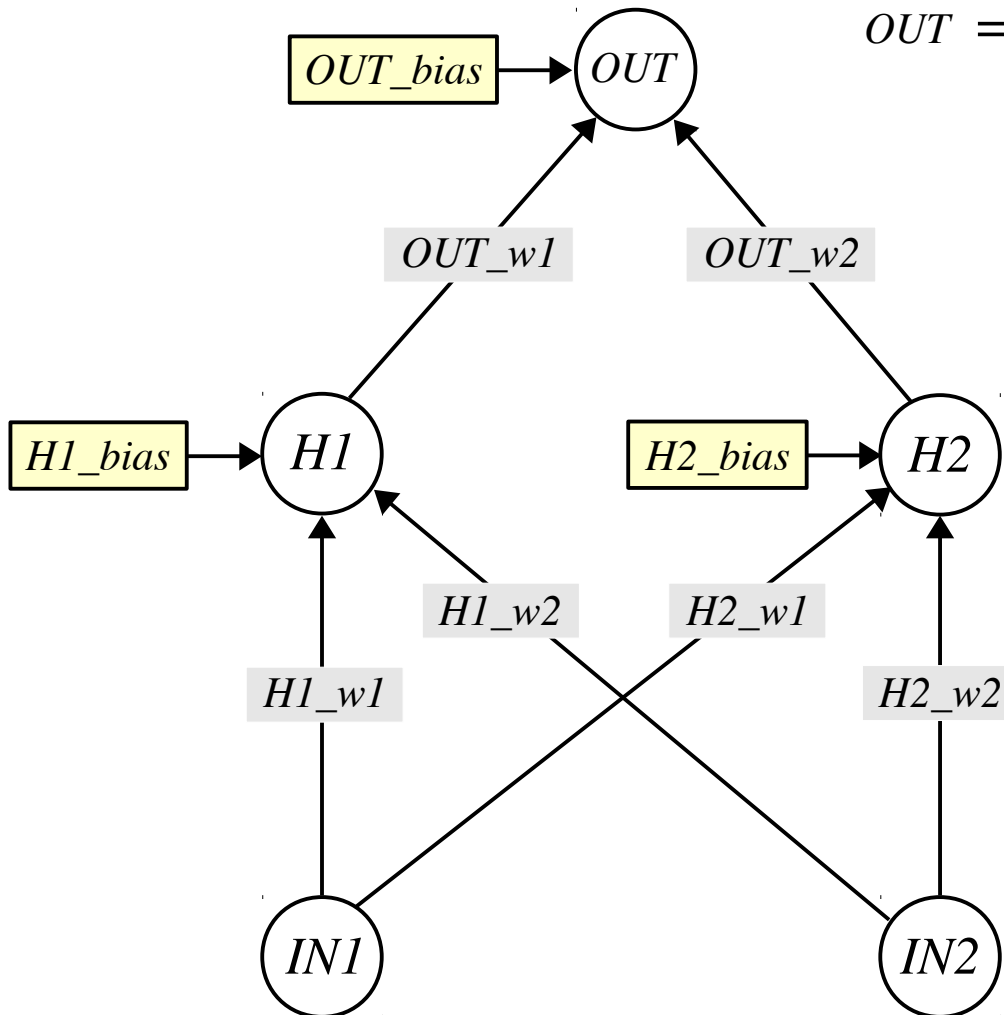
Summary: 2-2-1 Network – Forward Pass

$$\sigma(z) = \frac{1}{1 + e^{-z}}$$

$$H1 = \sigma(IN1 \times H1_w1 + IN2 \times H1_w2 + H1_bias)$$

$$H2 = \sigma(IN1 \times H2_w1 + IN2 \times H2_w2 + H2_bias)$$

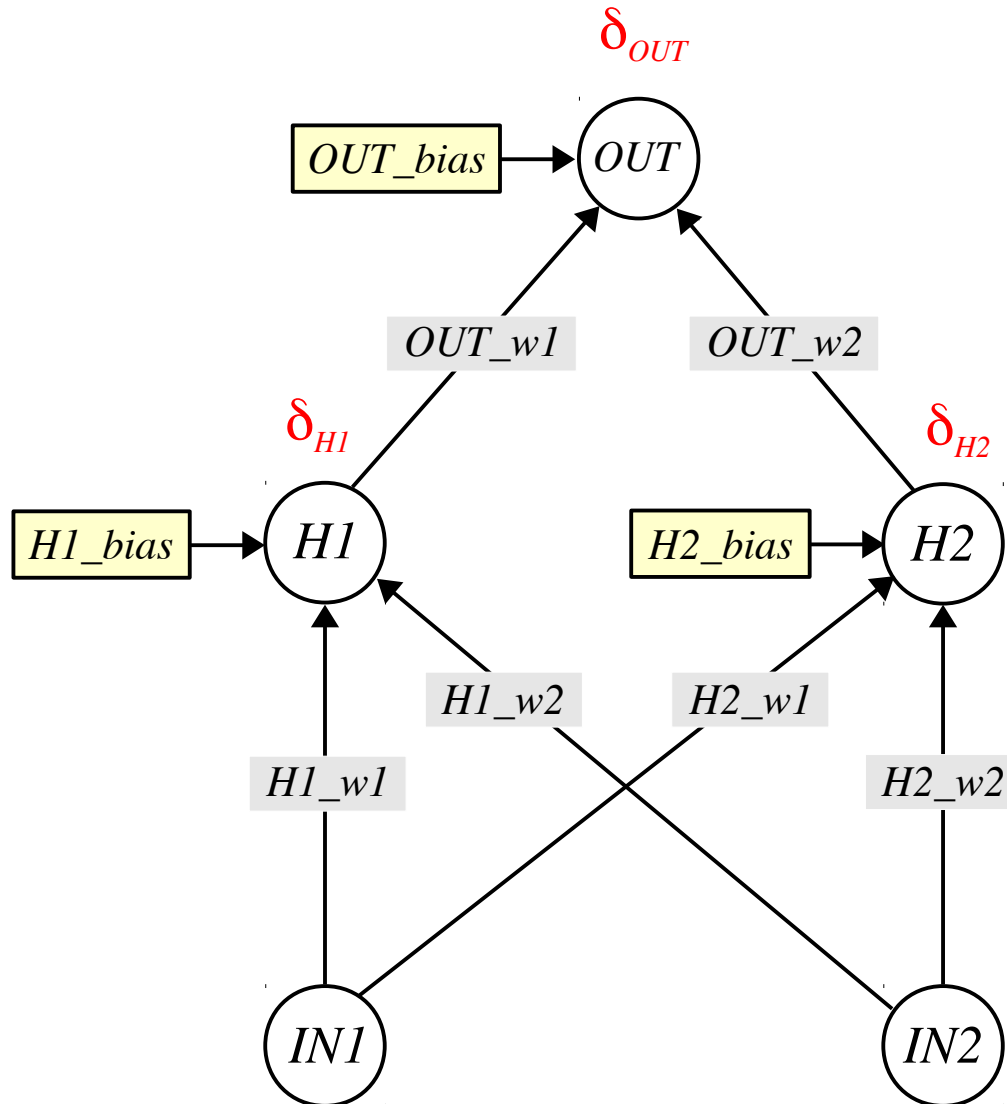
$$OUT = \sigma(H1 \times OUT_w1 + H2 \times OUT_w2 + OUT_bias)$$



Summary: 2-2-1 Network – Backward Pass

Learning rate
 $0 < \eta < 1$

TARGET



$$\delta_{OUT} = (OUT - TARGET) \times OUT \times (1 - OUT)$$

$$\delta_{H1} = (\delta_{OUT} \times OUT_{w1}) \times H1 \times (1 - H1)$$

$$\delta_{H2} = (\delta_{OUT} \times OUT_{w2}) \times H2 \times (1 - H2)$$

$$\Delta OUT_{w1} = -\eta \times \delta_{OUT} \times H1$$

$$\Delta OUT_{w2} = -\eta \times \delta_{OUT} \times H2$$

$$\Delta OUT_{bias} = -\eta \times \delta_{OUT}$$

$$\Delta H1_{w1} = -\eta \times \delta_{H1} \times IN1$$

$$\Delta H1_{w2} = -\eta \times \delta_{H1} \times IN2$$

$$\Delta H1_{bias} = -\eta \times \delta_{H1}$$

$$\Delta H2_{w1} = -\eta \times \delta_{H2} \times IN1$$

$$\Delta H2_{w2} = -\eta \times \delta_{H2} \times IN2$$

$$\Delta H2_{bias} = -\eta \times \delta_{H2}$$